REMARKS/ARGUMENTS

The present invention provides an optical module arranged in an optical transmission path comprises an optical amplifying unit configured with a semiconductor, wherein the optical amplifying unit amplifies in high gain light input from the optical transmission path, and an optical element configured with a semiconductor, wherein the optical element includes an optical modulator disposed in series with and behind an optical amplifying unit and propagates the light amplified by the optical amplifying unit to the optical transmission path, and is operative to produce gain sufficiently high that insertion loss of the optical module is completely compensated, wherein the optical modulator is a directional coupler modulator.

Claim 1 has been amended by this response. No new matter has been introduced. Support for the amended claim may be found at least at Fig. 2 and page 21, lines 6-10 of the application as filed. No claims were added. Claims 4-7, 12-14, and 25-29 are allowed. Claims 1, 4-7, 12-14, and 18-29 remain pending.

Claim 1 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Zah (USP No. 6,434,175) in view of Koch (USP No. 5,394,489). Claim 1 recites in part:

> "an optical element configured with a semiconductor, wherein the optical element includes an optical modulator. . . operative to produce gain sufficiently high that *insertion loss* of the optical module is completely compensated." (Emphasis added.)

The examiner cited Zah col. 2, lines 25-35 as teaching that "the insertion loss of the modulators is 3dB or more." August 6, 2008 office action, page 6, last paragraph. Applicants respectfully submit that this is a misapplication of the reference. The cited section of Zah states:

> "Long cavity lasers cannot be directly modulated at a high bit rate since the 3-dB modulation bandwidth decreases as the cavity length increases. If the peak frequency is close to one of the harmonic frequencies of the signal, the signal will be distorted. Hence, for high bit rate applications, a long cavity laser needs a high speed external modulator to shift the peak frequency back towards the center of the modulation bandwidth. This external modulator is quite expensive. Hence, there is at least a cost-saving reason to integrate a long cavity laser with an internal modulator for external modulation."

The cited section of Zah particularly in regard to the 3-dB bandwidth touches upon the physical properties of the cavity. One result is distortion of the signal under certain circumstances.

However, the cited section of claim 1 is about signal attenuation and compensating for it; areas on which the cited portion of Zah is silent. Hence, Zah does not teach explicitly or even impliedly the claimed feature.

Claim 1 now further recites in part:

> "the optical module further comprises a dc current controller configured to control the optical amplifying unit to inject a dc current in a reverse direction or a dc current equal or less than a predetermined value in a forward direction and to control an optical attenuation."

As illustrated by Fig. 2, the optical amplifying section includes a dc control section which is used to inject current in a forward or reverse direction to control the optical attenuation. Page 21, lines 6-10.

Zah teaches that a silicon optical amplifier is "optional." Fig. 8, col. 7, lines 24-25. Koch teaches "[a]n amplifier AM1 amplifies the signal appearing on the fiber OW1." Fig, 1, Col. 2, lines 44-45. Koch teaches a "current source," but one that only powers the lasers and is not connected to the amplifier: "a current source CS1 selectively actuates one or more of the eight lasers LA1 to LA8 by applying current to the selected laser or lasers." Fig. 1, col. 3, lines 22-25. However, Zah and Koch are silent about a dc control section used to control optical attenuation by injecting a dc current. Hence, neither Zah nor Koch teach directly or indirectly the claimed "dc current controller configured to control the optical amplifying unit to inject a dc current in a reverse direction or a dc current equal or less than a predetermined value in a forward direction and to control an optical attenuation."

Therefore, claim 1 should be allowed.

Claims 18-21 are objected to as being dependent upon a rejected base claim. Claims 18-21 should be allowed for at least the same reasons as claim 1 from which they depend.

Claims 22-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a non-elected species, there being no allowable generic or linking claim (i.e., claim 18). Claims 22-24 should now be reinstated, because it is believed that claim 18 should be allowed.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at (650) 326-2400.

Respectfully submitted,

Kenneth R. Allen

Kenneth R. Allen
Reg. No. 27,301

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: (650) 326-2400
Fax: (650) 326-2422
Attachments
KRA:BCS:deh:lam

61487361 v1